MTL 9460-ET range
Intrinsically safe Ethernet products

- Cost effective IS Ethernet equipment for Zone 1, Division 1 hazardous areas
- Connectivity into Zone 0
- Intrinsically safe Power over Ethernet (PoEx™) enables live connection or disconnection in Zone 0 and 1
- Serial-to-Ethernet Gateway
- Copper to Fibre-Optic Media Converter
- IS Ethernet Switch
- IS Ethernet Isolator
- IS Wireless LAN Access Point/Bridge

Today in Process Automation many different methods are used to power and to communicate with end devices. Such methods may include 4-20mA, a variety of different fieldbus standards; serial communications - including RS232, RS422 and RS485; video; telephony and Ethernet. Where applications require high bandwidth, Ethernet is the ideal solution as it provides open connectivity and can be combined with Ethernet Remote I/O and Linking Devices to connect to low bandwidth 4-20mA and fieldbus systems. But Ethernet has rarely been used in hazardous areas because of the high cost involved and the limitations involved in order to carry out maintenance.

The 9460-ET Series provides cost-effective Intrinsically Safe (IS) Ethernet equipment that can be installed and maintained easily in hazardous areas. The intrinsically safe hazardous area certification permits the components to be mounted in a Zone 1, or Division 1 hazardous area with connectivity into Zone 0 and the associated apparatus certification of the 9468-ET IS Ethernet isolator and 9491-PS IS power supply allow this equipment to be mounted in a Zone 2 hazardous area and connected to intrinsically safe equipment in a Zone 0 or 1, or Division 1 hazardous area.

In Process Automation it is also preferable to use a single cable to provide both power and communications to the end device. The 9460-ET Series can deliver Intrinsically Safe Power over Ethernet (PoEx™) with a single Cat 5e or Cat 6 cable, allowing live connection and disconnection of the end device in Zone 0 and 1 hazardous areas.

The 9461-ET Ethernet Gateway provides existing intrinsically safe equipment with "Ethernet connectivity" by allowing conventional serial communication equipment to be connected to an Ethernet network. Many intrinsically safe devices such as analysers, weighing systems, dust monitors, etc. have RS232, RS422 or RS485 serial connectivity. Providing these devices with Ethernet connectivity offers considerable hardware and integration cost savings.

The 9465-ET Copper to Fibre Optic Media Converter enables an Ethernet network to be extended over a much greater distance. A multi-mode fibre optic link running at 100Mbps can go distances of up to 2 km, or an extended distance of 5 km is achievable at 10Mbps. With single mode fibre longer distances are supported.

The 9466-ET Ethernet switch allows the interconnection of intrinsically safe Ethernet networking components via its 5 ports. It also enables a copper Ethernet network to be extended beyond the 100 metre distance limit between Ethernet devices.

The 9468-ET is an intrinsically safe Ethernet isolator enabling Ethernet devices in Zone 2, or a safe area, to communicate with intrinsically safe Ethernet networking components operating in the hazardous area. A further application is the use of a pair of 9468-ET isolators to permit an Ethernet cable to cross a hazardous area.

The 9469-ETplus Intrinsically safe Wireless LAN product is a multi-functional module that can be used as an 802.11a/b/g/h Access Point, a Wireless Bridge or a Wireless Repeater. Many end users have recognised the benefits of giving mobile operators access to control and maintenance system data.
A choice of intrinsically safe PDAs and Zone 2 PCs offering 802.11 wireless connectivity is now available. The 9469-ETplus offers lower costs and easier maintenance for WLAN equipment installed in hazardous areas, compared to the alternative of large, expensive flameproof enclosures fitted with specialist certified antennas.

The 9491-PS Power Supply is the preferred method for supplying the 9460-ET Series of IS Ethernet Modules as it is based on an isolating power supply. It takes a 24V DC Safe Area/Zone 2 supply and produces an Intrinsically Safe 12V DC nominal output capable of powering the Ethernet modules mounted in a Zone 1/Division 1 hazardous area.

The 9466-ET Ethernet Switch and the 9468-ET IS Ethernet Isolator are capable of distributing power to compatible devices connected to their IS ports providing Power over Intrinsically Safe Ethernet (PoEx™) via the RJ45 Cat5e cables. This method eliminates the need for a separate power supply cable to each Ethernet device; simplifying both installation and maintenance. A 9491-PS power supply is required to power the 9466-ET and an additional 9491-PS is required for each powered Ethernet port. Similarly, one 9491-PS is required to power the IS Ethernet port of the 9468-ET IS Ethernet Isolator. The 9461-ET, 9465-ET and 9469-ETplus can be powered directly from a 9491-PS intrinsically safe power supply or using Power over IS Ethernet (PsEx™).

The MTL IS Ethernet applications range from immediate needs for Hazardous Area WLAN infrastructure; IS serial device connectivity; and Ethernet connections across hazardous areas to long term opportunities to develop Ethernet field devices.

**APPLICATIONS**

- **9461-ET Ethernet Gateway** connects to intrinsically safe RS232, RS422 and RS485 devices
- **9469-ET Wireless LAN Access Point** connects to a wide choice of IS PDAs and Zone 2 PCs
- **9466-ET Ethernet Switch** connects directly to Intrinsically Safe Ethernet devices
MTL 9461-ET
Intrinsically Safe Serial to Ethernet Gateway

- Serial to Ethernet Gateway
- Zone 1, Division 1 mountable in suitable enclosure
- Four serial-port intrinsically safe inputs:
  - 2 x RS232/TTL
  - 2 x RS485/RS422
- 10/100Mbs Ethernet
- ATEX / IECEx certified
- FM / FMC approved
- Wide temp. range –40°C to +70°C
- High Performance 32-bit processor
- PoEx™ Power over IS Ethernet option

The 9461-ET Ethernet Gateway gives existing intrinsically safe equipment “Ethernet connectivity” by allowing conventional serial communication port equipment to be connected to an Ethernet network.

Two 9-way D-type serial ports are provided which are RS232/TTL compatible. In addition, the module’s front panel screw terminals (T6 - T15) provide two RS485/RS422, 2- or 4- wire ports, giving a total of four serial ports. All ports can operate at speeds up to 115K2baud.

Various protocols are available (e.g.: Serial Modbus, Modbus/TCP, Ethernet IP etc) in addition to Serial Tunnelling.

The 9461-ET is designed for hazardous-area mounting inside a suitable enclosure with intrinsically safe Zone 1, ATEX and IECEx certification and Division 1 FM USA and Canada approvals. The ATEX and IECEx approvals cover both surface industry and mining applications.

The design is based on a high performance ARM9 155MHz 32-bit RISC Processor (ARM926EJ-S).

The gateway may be powered by an intrinsically safe power supply or by Power over IS Ethernet (PoEx) providing intrinsically safe power and Ethernet communications over a single Cat5e cable.

10/100Mb Ethernet twisted pair (Cat5e) RJ45 connection (100metres length max.).

Status LEDs are provided on the front panel to indicate:
- ‘Power On’
- Network Link established
- Tx/Rx activity for all COM ports

Configuration is via a Microsoft® Windows™ interface which enables the IP address and the protocol conversion to be defined.

The Gateway can also act as the host processor for the 9466-ET Managed Ethernet Switch giving remote access to the switch’s management features over the Ethernet network.

The module is supplied as a DIN-rail mounting device.
SPECIFICATION

See also System Specification

POWER INPUT

PoEx or separately powered

Input voltage

12V DC (10–15.4V)

Input current

150mA

Input protection

Fuse + supply reversal diode

ETHERNET

Intrinsically Safe 10/100 base T

Connector

RJ45

PoEx

Powered Device

IS SERIAL CONNECTIONS

RS232 RS422/485
No. of channels 2 2
Connector Type DB-9 male Screw terminals
Baudrate 300-115K2 baud 300-115K2 baud
Parity Even/Odd/None Even/Odd/None
Data Bits 8 8
Stop Bits 1 1
Flow Control RTS/CTS/XON/XOFF XON/XOFF

RS232 Pin 9 power output

SAFETY

LED INDICATORS

<table>
<thead>
<tr>
<th></th>
<th>OFF</th>
<th>FLUSH</th>
<th>ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWR (green)</td>
<td>Power fail</td>
<td>N/A</td>
<td>Power OK</td>
</tr>
<tr>
<td>WDG (red)</td>
<td>Watchdog Fault</td>
<td>Healthy (10Hz)</td>
<td>Watchdog Fault</td>
</tr>
<tr>
<td>TX (x4) (green)</td>
<td>Idle</td>
<td>Transmitting Serial Data</td>
<td>N/A</td>
</tr>
<tr>
<td>RX (x4) (red)</td>
<td>Idle</td>
<td>Receiving Serial Data</td>
<td>Fault – RX data polarity is inverted</td>
</tr>
<tr>
<td>STAT (red)</td>
<td>Status is Normal</td>
<td>Not used at present</td>
<td>Not used at present</td>
</tr>
<tr>
<td>ACT (yellow)</td>
<td>Ethernet link disconnected</td>
<td>Ethernet link activity</td>
<td>Ethernet link connected</td>
</tr>
<tr>
<td>100 (green)</td>
<td>Ethernet link set to 10Mbps</td>
<td>N/A</td>
<td>Ethernet link is 100Mbps</td>
</tr>
</tbody>
</table>

ENVIROMENTAL

Ambient temp

Operating –40°C to +70°C

Storage –40°C to +70°C

Relative Humidity

5 to 95% RH (non-condensing)

Ingress Protection

Select enclosure to suit application, see certificate for information

DATA & POWER TERMINALS

COM 1 & 2 (DB-9 male)

RS232/TTL Ports

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DCD</td>
</tr>
<tr>
<td>2</td>
<td>RxD</td>
</tr>
<tr>
<td>3</td>
<td>TxD</td>
</tr>
<tr>
<td>4</td>
<td>RS232/TTL *</td>
</tr>
<tr>
<td>5</td>
<td>Signal Ground 0V</td>
</tr>
<tr>
<td>6</td>
<td>N/C</td>
</tr>
<tr>
<td>7</td>
<td>RTS</td>
</tr>
<tr>
<td>8</td>
<td>N/C</td>
</tr>
<tr>
<td>9</td>
<td>+5V o/p</td>
</tr>
</tbody>
</table>

LAN (RJ45)

10/100 BASE-T Ethernet

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tx +</td>
</tr>
<tr>
<td>2</td>
<td>Tx –</td>
</tr>
<tr>
<td>3</td>
<td>Rx +</td>
</tr>
<tr>
<td>4</td>
<td>Supply 12V - PoEx †</td>
</tr>
<tr>
<td>5</td>
<td>Supply 12V - PoEx †</td>
</tr>
<tr>
<td>6</td>
<td>Rx –</td>
</tr>
<tr>
<td>7</td>
<td>Supply 0V - PoEx †</td>
</tr>
<tr>
<td>8</td>
<td>Supply 0V - PoEx †</td>
</tr>
</tbody>
</table>

* Pin 4 - O/C for RS232, connect to pin 5 for TTL levels

Screw Terminals †

TERMINALS

<table>
<thead>
<tr>
<th>COM3</th>
<th>COM4</th>
<th>RS485</th>
<th>RS422</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>11</td>
<td>+ Tx/Rx</td>
<td>Tx +</td>
</tr>
<tr>
<td>7</td>
<td>12</td>
<td>– Tx/Rx</td>
<td>Tx –</td>
</tr>
<tr>
<td>8</td>
<td>13</td>
<td>–</td>
<td>Rx +</td>
</tr>
<tr>
<td>9</td>
<td>14</td>
<td>–</td>
<td>Rx –</td>
</tr>
<tr>
<td>10</td>
<td>15</td>
<td>Signal Ground 0V</td>
<td></td>
</tr>
</tbody>
</table>

† When using PoEx, no supply is required on screw terminals 1 to 4

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EVS 9461 rev 7 230916

MTL 9461-ET
September 2016
MTL 9465-ET
Copper to Fibre Intrinsically Safe Converter

- Copper to Fibre Optic Converter
- 10/100Mbps wire speed
- Extend up to 5km (10Mbps)
- Zone 1, Division 1 mountable in suitable enclosure
- Transparent operation
- Choice of fibre optic connection styles
- ATEX / IECEx certified
- FM / FMC approved
- Wide temp. range –40°C to +70°C
- PoEx™ Power over IS Ethernet option

The 9465-ET 10/100Mbps Copper to Fibre Optic Media Converter allows an Ethernet network to be extended over a greater distance. A multi-mode fibre optic link may be up to 2km in length when running at 100Mbps and due to the use of 1300nm optics an extended distance of 5km is achievable at 10Mbps. Longer distances are achievable with single mode fibre.

Longer distances are obtained by simply connecting a 9466 (10/100Mbps Ethernet Switch) between two 9465 media converters, effectively giving a ‘repeater’ function (This also provides 3 x UTP ports available for local network connectivity), this can be repeated as required.

The use of fibre optics gives exceptional immunity to noise and electrical interference, it is also used when connecting a Hazardous Area network to a Zone 2 / Safe Area network or device.

The 9465-ET is designed for hazardous-area mounting inside a suitable enclosure with intrinsically safe Zone 1, ATEX and IECEx certification and Division 1 FM USA and Canada approvals. The ATEX and IECEx approvals cover both surface industry and mining applications.

Fibre Optic connection options:
- ST style 62.5/125µm Multimode (9465-ET-M-ST)
- SC style 62.5/125µm Multimode (9465-ET-M-SC)
- SC style 9µm Single-mode (9465-ET-SC)

When installed in a Zone 1 or Division 1 hazardous area the converter may be powered by an intrinsically safe power supply or by Power over IS Ethernet (PoEx) providing intrinsically safe power and Ethernet communications over a single Cat5e cable.

When mounted in a safe area the converter may be powered by a 12V dc general-purpose power supply and the ‘IS op’ approval allows connection of the fibre optic cable into the hazardous area.

Status LEDs are provided on the front panel to indicate:
- ‘Power On’
- Fibre Optic ‘Link 10Mb or 100Mb’ established
- Fibre Optic ‘Tx/Rx Activity’
- Copper UTP ‘Link 10Mb or 100Mb’ established
- Copper UTP ‘Tx/Rx Activity’

10/100Mb Ethernet twisted pair (Cat5e) RJ45 connection (100metres length max.).

Transparent operation - 10/100Mbps, Full/Half Duplex with Auto-Negotiation. Supports IEEE 802.3: 10Base-T, 10Base-FL, 100Base-TX and 100Base-FX/SX.

The module is supplied as a DIN-rail mounting device.
**SPECIFICATION**

See also System Specification

**POWER INPUT**

PoE or separately powered

- **Input voltage**: 12V DC (10–15.4V)
- **Input current**: 160mA
- **Input protection**: Fuse + supply reversal diode

**ETHERNET**

Intrinsically Safe 10/100 base T

- **Connector**: RJ45
- **PoEx Powered Device**

**FIBRE PORT**

10/100 base FX

- **Connector**: SC or ST (multi-mode), SC (single-mode)
- **OPTICAL FIBRE**
- **Multi mode distance**: 2km @100Mbps / 5km@10Mbps typ. (62.5/125)
- **Single mode distance**: T.B.A.
- **TX Output (1300nm)**
  - Multi mode: -19dBm (min), -14dBm (max.) *note 1
  - Single mode: -15dBm (min), -8dBm (max.) *note 2
- **RX Sensitivity**
  - Multi mode: -33.9dBm (ave), -31dBm (min)
  - Single mode: -15dBm (min)

- *note 1 – transmit power coupled into 62.5/125um fibre, NA=0.275
- *note 2 – transmit power coupled into single-mode fibre

**SAFETY**

**Eye Safety**

- Class 1 Laser/LED product

**Location of module**

- Zone 1, IIC T4 hazardous area
- or Class 1, Div 1, Groups A, B, C, D T4 hazardous location

**Location of field wiring**

- Zone 0, IIC T4 hazardous area
- or Class 1, Div 1, Groups A, B, C, D T4 hazardous location

**Ethernet protection**

- Intrinsically safe
- Fibre optic protection inherently safe

**Certification Code**

See approvals

**Safety description**

See certificate

**MECHANICAL**

**Mounting**

- DIN rail

**Dimensions (mm)**

- **Length**: 75
- **Width**: 55
- **Height (off rail)**: 116

---

**Weight**

- 700 g

**LED INDICATORS**

<table>
<thead>
<tr>
<th></th>
<th>OFF</th>
<th>FLASH</th>
<th>ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWR (green)</td>
<td>Power fail</td>
<td>N/A</td>
<td>Power OK</td>
</tr>
<tr>
<td>ACT (red)</td>
<td>Idle</td>
<td>Ethernet link activity</td>
<td>Ethernet link activity</td>
</tr>
<tr>
<td>10 (yellow)</td>
<td>No Ethernet link at 10Mbps</td>
<td>Poor link</td>
<td>Ethernet connected at 100Mbps</td>
</tr>
<tr>
<td>100 (green)</td>
<td>No Ethernet link at 100Mbps</td>
<td>Poor link</td>
<td>Ethernet connected at 100Mbps</td>
</tr>
</tbody>
</table>

**ENVIRONMENTAL**

- **Ambient temp**
  - Operating: -40°C to +70°C
  - Storage: -40°C to +70°C

- **Relative Humidity**
  - 5 to 95% RH (non-condensing)

**Ingress Protection**

Select enclosure to suit application, see certificate for information

**DATA & POWER TERMINALS**

**LAN (RJ45)**

10/100 BASE-T Ethernet

- **TX/RX crossed MDI-X**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rx +</td>
</tr>
<tr>
<td>2</td>
<td>Rx –</td>
</tr>
<tr>
<td>3</td>
<td>Tx +</td>
</tr>
<tr>
<td>4</td>
<td>Supply 12V - PoEx †</td>
</tr>
<tr>
<td>5</td>
<td>Supply 12V - PoEx †</td>
</tr>
<tr>
<td>6</td>
<td>Tx –</td>
</tr>
<tr>
<td>7</td>
<td>Supply 0V - PoEx †</td>
</tr>
<tr>
<td>8</td>
<td>Supply 0V - PoEx †</td>
</tr>
</tbody>
</table>

**10/100 BASE-FL Ethernet**

ST(or SC) - Fibre Optic

- **Top Port**: TX
- **Bottom Port**: RX

**Screw Terminals †**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+12V DC in</td>
</tr>
<tr>
<td>2</td>
<td>+12V DC in</td>
</tr>
<tr>
<td>3</td>
<td>0V</td>
</tr>
<tr>
<td>4</td>
<td>0V</td>
</tr>
<tr>
<td>5-8</td>
<td>No connections</td>
</tr>
</tbody>
</table>

*Terminals 1+2 and 3+4 are linked internally.

† When using PoEx, no supply is required on screw terminals 1 to 4

---

The given data is only intended as a product description and should not be regarded as a legal warranty of properties or guarantee. In the interest of further technical developments, we reserve the right to make design changes.
MTL 9466-ET
Intrinsically Safe Managed Ethernet Switch

- 5-port 10/100Mbps links
- Zone 1, Division 1 mountable in suitable enclosure
- Broadcast “storm” protection
- Intelligent Routing
- Programmable Management
- ATEX / IECEx certified
- FM / FMC approved
- Wide temp. range –40°C to +70°C
- Half/Full Duplex
- Power source for PoEx™ Power over IS Ethernet
- Status LEDs to show activity

The 9466-ET 10/100Mbps, Layer 2, Ethernet switch allows the interconnection of MTL 9460-ET range networking modules via its 5 ports. It also enables an Ethernet network to cover a greater distance using either Cat5e cable or fibre-optic for longer spans. This capability is due to the low latency ‘store and forward’ mechanism integral to the switch, which ensures that the stringent timing associated with Ethernet is maintained.

With the 9466-ET switch each connection is effectively a ‘point-to-point’ network segment unlike the older generation hubs that were simple ‘dumb’ repeaters. The old hubs needed to impose a limit on overall network length to ensure proper collision detection; this limit is overcome by the 9466-ET. Broadcast “storm” protection is also provided to eliminate network overload due to excessive ‘broadcast’ & ‘multicast’ packets.

The 9466-ET switch can also distribute power to compatible devices connected to each of its five ports via the RJ45 Cat5e cables (PoEx). This method eliminates the separate power supply cable to the device simplifying installation and maintenance.

The 9466-ET is designed for hazardous-area mounting inside a suitable enclosure with intrinsically safe Zone 1, ATEX and IECEx certification and Division 1 FM USA and Canada approvals. The ATEX and IECEx approvals cover both surface industry and mining applications.

The default mode of operation is a 5-port, unmanaged switch with auto negotiation. However the onboard EEPROM memory can be configured via the serial RS232/TTL port either in the safe area, using a PC, or in the hazardous area using the 9461-ET Ethernet Gateway as its host processor.

Programmable features such as Rate Limiting, VLAN support and Forced Speed and Duplex settings may be configured in this way, along with access to MIB counters etc. The 9466-ET also has Intelligent Routing with automatic address learning, aging and migration.

It supports IEEE 802.3: 10Base-T, 100Base-TX and also MDI / MDI-X auto crossover, for easy cascading of switches with standard cables.

The module is supplied as a DIN-rail mounting device.
SPECIFICATION
See also System Specification

POWER INPUT
Separately powered
Input voltage
12V DC (10–15.4V)
Input current
200mA
Input protection
Fuse + supply reversal diode

ETHERNET
Intrinsically Safe 10/100 base T, auto negotiation speed and X-over
Ports
5
Connector
RJ45
PoEx
Power Source Equipment, each port selectable by connection of IS power supply such as 9491-PS

TECHNOLOGY
Standards
IEEE802.3, 802.3u, 802.3x, 802.1d, 802.1p, 802.1q
Protocols
IGMP V1/V2 device
MIB Counters
(via RS232 port)
Flow Control
IEEE802.3x flow control, back pressure flow control

IS RS232 MANAGED SWITCH CONNECTION
Number of channels
1
Connector Type
8-pin mini-DIN
Baudrate
115K2baud
Parity
None
Data Bits
8
Stop Bits
1
Flow Control
None

SAFETY
Location of module
Zone 1, IIC T4 hazardous area or Class 1, Div 1, Groups A, B, C, D T4 hazardous location
Location of field wiring
Zone 0, IIC T4 hazardous area or Class 1, Div 1, Groups A, B, C, D T4 hazardous location
Ethernet protection
intrinsically safe
Certification Code
See approvals
Safety description
See certificate

MECHANICAL
Mounting
DIN rail

Dimensions (mm)
Length 75
Width 100
Height (off rail) 116
Weight 1200 g

LED INDICATORS
<table>
<thead>
<tr>
<th></th>
<th>OFF</th>
<th>FLASH</th>
<th>ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWR (green)</td>
<td>Power fail</td>
<td>N/A</td>
<td>Power OK</td>
</tr>
<tr>
<td>WDG (red)</td>
<td>Watchdog Fault</td>
<td>Healthy (10Hz)</td>
<td>Watchdog Fault</td>
</tr>
<tr>
<td>FDX (red)</td>
<td>Half Duplex</td>
<td>N/A</td>
<td>Full Duplex</td>
</tr>
<tr>
<td>10 ACT (yellow)</td>
<td>No Ethernet link at 10Mbps</td>
<td>Ethernet connected and activity at 10Mbps</td>
<td>Ethernet connected at 10Mbps</td>
</tr>
<tr>
<td>100 ACT (green)</td>
<td>No Ethernet link at 100Mbps</td>
<td>Ethernet connected and activity at 100Mbps</td>
<td>Ethernet connected at 100Mbps</td>
</tr>
</tbody>
</table>

ENVIRONMENTAL
Ambient temp
Operating –40°C to +70°C
Storage –40°C to +70°C
Relative Humidity
5 to 95% RH (non-condensing)
Ingress Protection
Select enclosure to suit application, see certificate for information

DATA & POWER TERMINALS
LAN PORTS (RJ45) 10/100 BASE-T Ethernet

Screw Terminals

Notes:
1. Terminals 1+2 and 3+4 are linked internally
2. When using PoEx – ‘inject’ device power into terminals 6 to 15 as required

EATON
Powering Business Worldwide

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The given data is only intended as a product description and should not be regarded as a legal warranty of properties or guarantee. In the interest of further technical developments, we reserve the right to make design changes.
MTL 9468-ET
Intrinsically Safe Ethernet Isolator

- Zone 2 mountable for connections to Zone 0 and 1
- Galvanically isolated RJ45 ports
- Transparent operation
- Compact alternative solution to fibre optics and media converters
- ATEX / IECEx certified
- FM / FMC approved
- Wide temp. range -40°C to +70°C
- Single 20–30V DC power supply
- Status LEDs to show activity

The 9468-ET 10/100Mbps, Isolating Ethernet Barrier allows the interconnection of a Zone 2 or uncertified safe area device to the intrinsically safe 9400-ET range of Ethernet networking products, operating in the hazardous area.

The isolating barrier provides a compact alternative solution to fibre optic cable and media converters and for when it is desirable to use Cat5e cables in preference to fibre.

The 9468-ET is designed for Zone 2 hazardous-area mounting inside a suitable enclosure and has intrinsically safe ATEX and IECEx approvals, together with IS approval for USA and Canada. FM Division 2 mounting approval is pending. The ATEX and IECEx approvals cover both surface industry and mining applications.

10/100Mb Ethernet twisted pair (Cat5e) RJ45 connections (100metres length max.). These RJ45 ports provide total galvanic isolation (Um=253Vac) from safe to hazardous areas.

Status LEDs are provided on the front panel to indicate:
- 'Power On'
- Safe Area UTP 'Link 10/100Mb' established
- Safe Area UTP ‘Tx/Rx Activity’
- Haz. Area UTP ‘Link 10/100Mb’ established
- Haz. Area UTP ‘Tx/Rx Activity’

The module operates from a single supply in the Safe Area of 20…30Vdc at approx. 220mA.

Transparent operation - 10/100Mbps, Full/Half Duplex with Auto-Negotiation. Supports IEEE 802.3: 10Base-T and 100Base-TX.

The module is supplied as a DIN-rail mounting device.
SPECIFICATION
See also System Specification

POWER INPUT
Separately powered
Input voltage
24V DC (20–30V)
Input current
220mA
Input protection
Fuse + supply reversal diode

GENERAL PURPOSE ETHERNET
10/100 base T
Connector
RJ45

IS ETHERNET
Intrinsically Safe 10/100 base T
Connector
RJ45
PoEx
Power Source Equipment, on hazardous area LAN by connection of IS power supply such as 9491-IS

SAFETY
Location of module
Safe Area
Zone 2 hazardous area
Location of field wiring
Zone 0, IIC T4 hazardous area
or Class 1, Div 1, Groups A, B, C, D T4 hazardous location
Ethernet protection
Intrinsically safe
Certification Code
See approvals
Safety description
See certificate

MECHANICAL
Mounting
DIN rail
Dimensions (mm)
Length 75
Width 100
Height (off rail) 116
Weight 380 g

LED INDICATORS
<table>
<thead>
<tr>
<th></th>
<th>OFF</th>
<th>FLASH</th>
<th>ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWR (green)</td>
<td>24V Power fail</td>
<td>N/A</td>
<td>24V Power OK</td>
</tr>
<tr>
<td>ACT (red)</td>
<td>Idle</td>
<td>Ethernet link activity</td>
<td>Ethernet link activity</td>
</tr>
<tr>
<td>10 (yellow)</td>
<td>No Ethernet link at 10Mbps</td>
<td>Poor link</td>
<td>Ethernet connected at 10Mbps</td>
</tr>
<tr>
<td>100 (green)</td>
<td>No Ethernet link at 100Mbps</td>
<td>Poor link</td>
<td>Ethernet connected at 100Mbps</td>
</tr>
</tbody>
</table>

ENVIRONMENTAL
Ambient temp
Operating –40°C to +70°C
Storage –40°C to +70°C
Relative Humidity
5 to 95% RH (non-condensing)
Ingress Protection
Select enclosure to suit application, see certificate for information

DATA & POWER TERMINALS
LAN Terminals (RJ45)
10/100 BASE-T Ethernet
Safe Area and Hazardous Area (marked blue)

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rx +</td>
</tr>
<tr>
<td>2</td>
<td>Rx –</td>
</tr>
<tr>
<td>3</td>
<td>Tx +</td>
</tr>
<tr>
<td>4</td>
<td>Supply 12V - PoEx †</td>
</tr>
<tr>
<td>5</td>
<td>Supply 12V - PoEx †</td>
</tr>
<tr>
<td>6</td>
<td>Tx –</td>
</tr>
<tr>
<td>7</td>
<td>Supply 0V - PoEx †</td>
</tr>
<tr>
<td>8</td>
<td>Supply 0V - PoEx †</td>
</tr>
</tbody>
</table>

Screw Terminals

<table>
<thead>
<tr>
<th>PWR</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+20 – 30V DC in</td>
</tr>
<tr>
<td>2</td>
<td>+20 – 30V DC in</td>
</tr>
<tr>
<td>3</td>
<td>0V</td>
</tr>
<tr>
<td>4</td>
<td>0V</td>
</tr>
<tr>
<td>5-13</td>
<td>No connections</td>
</tr>
<tr>
<td>14</td>
<td>Supply in 12V - PoEx †</td>
</tr>
<tr>
<td>15</td>
<td>Supply in 0V - PoEx †</td>
</tr>
</tbody>
</table>

† When using PoEx, inject device power into terminals 14 & 15 (marked blue).

The given data is only intended as a product description and should not be regarded as a legal warranty of properties or guarantee. In the interest of further technical developments, we reserve the right to make design changes.
MTL 9469-ET plus
Intrinsically Safe Wireless Access Point/Bridge

- Tri-Band operation
- Convert Ethernet device to wireless
- Zone 1, Division 1 mountable
- Rapid roaming
- 10/100Mbs Ethernet
- ATEX / IECEx certified
- FM / FMC approved
- Wide temp. range –40°C to +60°C
- PoEx™ Power over IS Ethernet option

The 9469-ETplus is a multi-functional module that can be used as an Access Point, Wireless Bridge (Client) or Wireless Repeater.

When used in the Access Point (AP) mode, it allows wireless devices to connect through it and onto the wired Ethernet network, either in AD-HOC or Infrastructure modes.

When used as a Bridge, it makes it possible to turn any 10/100 Ethernet device into a wireless device, or to connect two network segments together to make a single network (without the interconnecting wire or fibre optic).

Additionally the module may also be used in its Wireless Repeater (WDS) mode to extend the range covered by a wireless network.

Designed for hazardous-area mounting, the 9469-ETplus has intrinsically safe, Zone 1, ATEX and IECEx certification and Division 1 FM (USA and Canada) approvals, and may only require a suitably IP-rated enclosure, where necessary. The ATEX and IECEx approvals cover both surface industry and mining applications.

The unit may be powered by an intrinsically safe power supply or by Power over IS Ethernet (PoEx) providing intrinsically safe power and Ethernet communications over a single Cat5e cable.

The Tri-Band operation offers flexibility in situations where the 2.4GHz band may be overcrowded or where operation in the 5GHz and 5.4GHz bands is desired. Optional dual antennae also provide diversity improving wireless operation.

Compliant with IEEE 802.11 a/b/g/h & Super AG standards, up to 108 Mbps data rate and provides security: WEP, WPA-PSK, WPA2-PSK and IEEE 802.1X (RADIUS).

Status LEDs are provided on the front panel for:
- ‘Power On’
- WLAN ‘Activity’
- Status/Fault
- Copper UTP ‘Activity’
- Copper UTP ‘10/100Mb Link’

Configuration is straightforward with an easy to use web based application. The unit supports 802.11d (multi-country roaming) which allows the country to be selected during setup, ensuring the configuration complies with regulatory limits. The module is supplied as a DIN-rail mountable unit.
**SPECIFICATION**

**POWER INPUT**
PoEx or separately powered
Input voltage: 12V DC (9.5–12.8V)
Input current: 270mA
Input protection: Fuse + supply reversal diode

**IS ETHERNET**
Intrinsically Safe 10/100 base T

**PoEx**
Powered Device

**WLAN**
Standards: IEEE 802.11a/b/g/h
Frequency range: 2.4 / 5 / 5.4GHz
Data Rate: up to 108Mbps (Super AG mode)
Modulation: OFDM: BPSK, QPSK, 16QAM, 64QAM, DSSS: DBPSK, DQPSK, CCK
Operating channels (802.11bg):
- USA / Canada: 1-11
- Europe / Australia: 1-13
- Japan: 1-14 (channel 14 for 802.11b only)

**Security**
64/128 bits WEP, WPA-PSK, WPA2-PSK, IEEE 802.11x authentication, MAC address filtering, SSID broadcast control

**Transmit power**
+20dBm with TPC (100mW max.)

**RX Sensitivity**
-92dBm for IEEE 802.11a/g
-95dBm for IEEE 802.11b

**Rapid Roaming**
<50ms

**Antenna connector**
2 x Female SMA - standard polarity

**SOFTWARE**
Administration software:
Web-based management using any standard web browser (Internet Explorer, Netscape, Mozilla…), SNMP agent (MIB 2.12)

**FIRMWARE**
Runs versions 5.20 and higher

**SAFETY**
Location of module:
Zone 1, IIC T4 hazardous area
or Class 1, Div 1, Groups A, B, C, D T4 hazardous location

**Location of field wiring**
Zone 0, IIC T4 hazardous area
or Class 1, Div 1, Groups A, B, C, D T4 hazardous location

**ENVIRONMENTAL**
Ambient temp:
Operating: −40°C to +60°C (except where stated in individual module specifications)
Storage: −40°C to +60°C
Relative Humidity: 5 to 95% RH (non-condensing)

**LED INDICATORS**

<table>
<thead>
<tr>
<th></th>
<th>OFF</th>
<th>FLASH</th>
<th>ON</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PWR</strong> (green)</td>
<td>Power fail</td>
<td>N/A</td>
<td>Power OK</td>
</tr>
<tr>
<td><strong>WLAN</strong> (yellow)</td>
<td>Idle</td>
<td>Wireless LAN data activity</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>STAT</strong> (red)</td>
<td>AP mode = Normal status</td>
<td>–</td>
<td>Fault</td>
</tr>
<tr>
<td>Bridge mode = connection to AP is established</td>
<td>Bridge mode = attempting to connect to AP</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ACT</strong> (yellow)</td>
<td>Ethernet link disconnected</td>
<td>Ethernet link activity</td>
<td>Ethernet link connected</td>
</tr>
<tr>
<td><strong>100</strong> (green)</td>
<td>Ethernet link set to 10Mbps</td>
<td>N/A</td>
<td>Ethernet link is 100Mbps</td>
</tr>
</tbody>
</table>

**Ethernet protection**
intrinsically safe

**Certification Code**
See Approvals page

**Safety description**
See certificate

**MECHANICAL**
Mounting:
DIN rail

**Dimensions (mm)**
- Length: 75
- Width: 100
- Height (off rail): 116

**Weight**
1200 g

**SOFTWARE**
Administration software:
Web-based management using any standard web browser (Internet Explorer, Netscape, Mozilla…), SNMP agent (MIB 2.12)

**FIRMWARE**
Runs versions 5.20 and higher

**SAFETY**
Location of module:
Zone 1, IIC T4 hazardous area
or Class 1, Div 1, Groups A, B, C, D T4 hazardous location

**Location of field wiring**
Zone 0, IIC T4 hazardous area
or Class 1, Div 1, Groups A, B, C, D T4 hazardous location

**ENVIRONMENTAL**
Ambient temp:
Operating: −40°C to +60°C (except where stated in individual module specifications)
Storage: −40°C to +60°C
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**Ethernet protection**
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**Certification Code**
See Approvals page

**Safety description**
See certificate

**MECHANICAL**
Mounting:
DIN rail

**Dimensions (mm)**
- Length: 75
- Width: 100
- Height (off rail): 116

**Weight**
1200 g

**LED INDICATORS**

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**ENVIRONMENTAL**
Ambient temp:
Operating: −40°C to +60°C (except where stated in individual module specifications)
Storage: −40°C to +60°C
Relative Humidity: 5 to 95% RH (non-condensing)

**Ingress Protection**
Select enclosure to suit application, see certificate for information
MECHANICAL
Mounting method
DIN-rail
DIN-rail types
‘Top hat’, 35 x 7.5 mm to EN 50022 or DIN 46277

ENVIRONMENTAL
Ambient temp
Operating –40°C to +70°C
(except where stated in individual module specifications)
Storage –40°C to +70°C
Relative Humidity
5 to 95% RH (non-condensing)
Ingress Protection
IP20 to BS EN 60529
(Additional protection by means of enclosure)

ELECTRICAL
EMC compliance
To EN61326:1998 Electrical equipment for measurement, control and laboratory use – EMC requirements
Electrical safety
EN 61010-1

APPLICABLE STANDARDS:
• Factory Mutual Research Co., Class No. 3610 for Class I, II, III, Divisions 1 and 2, Groups A - G hazardous locations (Intrinsically safe circuits).
• Factory Mutual Research Co., Class No. 3611 for Class I, Division 2, Groups A, B, C, D hazardous locations
• EN 60079-0:2006, IEC 60079-0:2004 Electrical apparatus for explosive gas atmospheres – General requirements
• EN/IEC 60079-15:2005 Electrical apparatus for explosive gas atmospheres - Construction, test and marking of type of protection “n” electrical apparatus
• IEC 61241-0:2004 Electrical apparatus for use in the presence of combustible dust. General requirements
• IEC 61241-11:2005 Electrical apparatus for use in the presence of combustible dust. Protection by intrinsic safety “ID”
• EN 50303:2000 Group I, Category M1 equipment intended to remain functional in atmospheres endangered by firedamp and/or coal dust
• EC Directive 94/9/EC (ATEX 100A)

PHYSICAL NETWORK
Ethernet
### 9461-ET, 9465-ET-x-xx, 9466-ET

<table>
<thead>
<tr>
<th>Region</th>
<th>International IECEx</th>
<th>USA</th>
<th>Canada</th>
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</thead>
<tbody>
<tr>
<td><strong>Authority</strong></td>
<td><strong>Europe (ATEX)</strong></td>
<td><strong>FM</strong></td>
<td><strong>FMC</strong></td>
</tr>
<tr>
<td><strong>Approval</strong></td>
<td>E II IGD</td>
<td>IS/I/1/ABCD/T4 Ta=70°C</td>
<td>IS/I/1/ABCD/T4 Ta=70°C</td>
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<tr>
<td><strong>for</strong></td>
<td>Ga Ex ia IIC T4</td>
<td>I/0/AEx ia IIC T4 Ta=70°C</td>
<td>I/0/AEx ia IIC T4 Ta=70°C</td>
</tr>
<tr>
<td><strong>Approved</strong></td>
<td>Ex iaD 20 T135°C Ma Ex ia I (Ta = –40°C to +70°C)§</td>
<td><strong>for</strong></td>
<td><strong>for</strong></td>
</tr>
<tr>
<td><strong>for</strong></td>
<td>Ga Ex ia IIC T4</td>
<td><strong>for</strong></td>
<td><strong>for</strong></td>
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<tr>
<td><strong>Cert. no.</strong></td>
<td>Sira 07ATEX2064X</td>
<td>IECEx SIR 07.0042X</td>
<td>3034995</td>
</tr>
</tbody>
</table>

§ (see specification for operating temperature range)

### 9468-ET

<table>
<thead>
<tr>
<th>Region</th>
<th>International IECEx</th>
<th>USA</th>
<th>Canada</th>
</tr>
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<tbody>
<tr>
<td><strong>Authority</strong></td>
<td><strong>Europe (ATEX)</strong></td>
<td><strong>FM</strong></td>
<td><strong>FMC</strong></td>
</tr>
<tr>
<td><strong>Approval</strong></td>
<td>E II IGD Ga Ex ia IIC T4 Ex iaD 20 T135°C Ma Ex ia I (Ta = –40°C to +70°C)§</td>
<td>AIS/I/1/ABCD/T4 Ta=70°C</td>
<td>AIS/I/1/ABCD/T4 Ta=70°C</td>
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<tr>
<td><strong>for</strong></td>
<td>Ga Ex ia IIC T4</td>
<td>I/0/AEx ia IIC T4 Ta=70°C</td>
<td>I/0/AEx ia IIC T4 Ta=70°C</td>
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<td>IECEx SIR 07.0043</td>
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</table>

§ (see specification for operating temperature range)

* (for guidance on the Gc, nLc & nAc marking)
### APPROVALS - for complete certification information visit www.mtl-inst.com/support/certificates/

#### 9469-ETplus

<table>
<thead>
<tr>
<th>Region</th>
<th>International IECEx</th>
<th>USA</th>
<th>Canada</th>
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</thead>
<tbody>
<tr>
<td>Authority</td>
<td>SIRA</td>
<td>SIRA</td>
<td>FMC</td>
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<tr>
<td></td>
<td>EN 50303: 2000,</td>
<td>IEC 60124-1: 2005</td>
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</tr>
<tr>
<td></td>
<td>IEC 61241-0: 2004,</td>
<td>IEC 60124-1: 2005</td>
<td></td>
</tr>
<tr>
<td>Approved for</td>
<td>Ma Ex ia I</td>
<td>IS/I/1/ABCD/T4 Ta=60°C</td>
<td>IS/I/1/ABCD/T4 Ta=60°C</td>
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<tr>
<td></td>
<td>Ga Ex ia IIC T4</td>
<td>I/0/AEx ia IIC T4 Ta=60°C</td>
<td></td>
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<tr>
<td></td>
<td>Ex iaD 20 T135°C (Ta = –40°C to +60°C)§</td>
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<td>Cert. no.</td>
<td>Sira 07ATEX2064X</td>
<td>3034995</td>
<td>3034995C</td>
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</tbody>
</table>

§ (see specification for operating temperature range)

#### 9491-PS

<table>
<thead>
<tr>
<th>Region</th>
<th>International IECEx</th>
<th>USA</th>
<th>Canada</th>
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<tbody>
<tr>
<td>Authority</td>
<td>SIRA</td>
<td>SIRA</td>
<td>FMC</td>
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<td></td>
<td>EN 50303: 2000,</td>
<td>IEC 60124-1: 2005</td>
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<td></td>
<td>IEC 61241-0: 2004,</td>
<td>IEC 60124-1: 2005</td>
<td></td>
</tr>
<tr>
<td>Approved for</td>
<td>(Ga) [Ex ia] IIB</td>
<td>AIS/I/1/CD/Ta = 70°C</td>
<td>AIS/I/1/CD/Ta = 70°C</td>
</tr>
<tr>
<td></td>
<td>(Gb) [Ex ib] IIB</td>
<td>I/0/[AEx ia] IIB, Ta = 70°C</td>
<td>I/0/[Ex ia] IIB, Ta = 70°C</td>
</tr>
<tr>
<td></td>
<td>(Ex iaD)</td>
<td>I/1/[AEx ib] IIB, Ta = 70°C</td>
<td>I/1/[Ex ib] IIB, Ta = 70°C</td>
</tr>
<tr>
<td></td>
<td>(Ma) [Ex ia] I</td>
<td>Ta = 0°C to +70°C</td>
<td>(Ga) [Ex ia] IIB</td>
</tr>
<tr>
<td></td>
<td>(Mb) [Ex ib] I</td>
<td>(Gb) [Ex ib] IIB</td>
<td>(Gb) [Ex ib] IIB</td>
</tr>
<tr>
<td></td>
<td>Ta = 0°C to +70°C</td>
<td>(Ma) [Ex ia] I</td>
<td>(Mb) [Ex ib] I</td>
</tr>
<tr>
<td>Cert. no.</td>
<td>Sira 08ATEX2188</td>
<td>3036457</td>
<td>3036457C</td>
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ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9461-ET</td>
<td>IS serial to Ethernet gateway</td>
<td>ANTSMA94</td>
<td>Omni-directional antenna - 2.4GHz, 3dBi gain</td>
</tr>
<tr>
<td>9465-ET-M-ST</td>
<td>IS media converter</td>
<td>9491-PS</td>
<td>IS power supply</td>
</tr>
<tr>
<td>9465-ET-M-SC</td>
<td>IS media converter</td>
<td>CSL9405-xxx</td>
<td>Copper twisted pair FTP Patch Cable (pre-terminated with RJ45 - RJ45 connectors)</td>
</tr>
<tr>
<td>9465-ET-S-SC</td>
<td>IS media converter</td>
<td></td>
<td>-xxx suffix denotes the cable length.</td>
</tr>
<tr>
<td>9466-ET</td>
<td>IS managed Ethernet switch</td>
<td></td>
<td>Lengths available from 0.5m – 100m</td>
</tr>
<tr>
<td>9468-ET</td>
<td>IS Ethernet isolator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9469-ETplus</td>
<td>IS wireless AP/bridge</td>
<td></td>
<td></td>
</tr>
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</table>

* (for guidance on marking)